Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A catheter assembly comprising:

a catheter shaft, the catheter shaft having a length and an outer surface;

a balloon, the balloon comprising a proximal balloon waist, a distal balloon waist and a body portion therebetween, the balloon having an expanded state and a unexpanded state, in the expanded state the body portion having an expanded diameter and in the unexpanded state the body portion having an unexpanded diameter that is less than the expanded diameter; and

~~and~~ a proximal collar and a distal collar, the proximal collar fixed ~~engaged~~ to the catheter shaft and the distal collar fixed ~~engaged~~ to the catheter shaft, each collar having a nonactivated state and an activated state, in the nonactivated state the distal balloon waist being rotatable about the distal collar and the proximal balloon waist being rotatable about the proximal collar, in the activated state the proximal collar being expanded to sealingly engage the proximal balloon waist and the distal collar being expanded to sealingly engage the distal balloon ~~collar~~ waist.

2. (Original) The catheter assembly of claim 1 wherein the collars are actuated between the nonactivated state and the activated state by exposure to an electric current.

3. (Original) The catheter assembly of claim 2 further comprising at least one electrically conductive member, each collar being in electronic communication with the at least one electrically conductive member.

4. (Original) The catheter assembly of claim 3 further comprising a source of electrical current, the source being in electronic communication with the at least one electrically conductive member.

5. (Original) The catheter assembly of claim 4 wherein the catheter shaft comprises an inner catheter shaft and an outer catheter shaft, the proximal collar being engaged to a portion of the outer catheter shaft and the distal collar being engaged to a portion of the inner catheter shaft.

6. (Original) The catheter assembly of claim 5 wherein the inner catheter shaft is at least partially constructed of at least one material of the group consisting of: HDPE, Pebax, Polyamide, Nylon, multilayer extrusions and any combination thereof.

7. (Original) The catheter assembly of claim 6 wherein the at least one electrically conductive member is at least partially enclosed by the inner catheter shaft.

8. (Original) The catheter assembly of claim 7 wherein the at least one electrically conductive member is co-extruded with the at least one material of the inner catheter shaft.

9. (Original) The catheter assembly of claim 5 wherein the outer catheter shaft is at least partially constructed of at least one material of the group consisting of: Pebax, Nylon, nanocompostites, multilayer extrusions, and any combination thereof.

10. (Original) The catheter assembly of claim 9 wherein the at least one electrically conductive member is at least partially enclosed by the outer catheter shaft.

11. (Original) The catheter assembly of claim 10 wherein the at least one electrically conductive member is co-extruded with the at least one material of the outer catheter shaft.

12. (Original) The catheter assembly of claim 3 wherein the at least one electrically conductive member is at least partially constructed of at least one material of the group consisting of: gold, silver, platinum, nitinol, and any combination thereof.

13. (Original) The catheter assembly of claim 5 wherein the outer catheter shaft is disposed about a portion of the inner catheter shaft, an inflation lumen in fluid communication with an interior of the balloon body being defined by a space between the inner catheter shaft and the outer catheter shaft.

14. (Original) The catheter assembly of claim 13 wherein the portion of the outer catheter shaft is disposed about a support ring, the inner catheter shaft extending through the support ring.

15. (Original) The catheter assembly of claim 7 wherein the support ring is at least partially constructed of at least one material of the group consisting of: stainless steel, Nitinol, acetyl, PI, HDPE, LX2/TR55, nanocomposites, ceramics, and any combinations thereof.

16. (Original) The catheter assembly of claim 1 further comprising at least one marker band the at least one marker band being engaged to a portion of the catheter shaft.

17. (Original) The catheter assembly of claim 16 wherein the at least one marker band is at least partially radiopaque.

18. (Original) The catheter assembly of claim 16 wherein the at least one marker band is detectable by at least one imaging modality selected from the group consisting of X-Ray, MRI ultrasound and a combination thereof.

19. (Original) The catheter assembly of claim 1 wherein the balloon is constructed of at least one member of the group consisting of: Pebax, Nylon, PET, polyester, polyolefm copolymer) and any combination thereof.

20. (Original) The catheter assembly of claim 3 wherein the at least one conductive member is positioned within at least a portion of the balloon.

21. (Original) The catheter assembly of claim 20 wherein the at least one electrically conductive member is co-extruded within the at least a portion of the balloon.

22. (Original) The catheter assembly of claim 3 wherein the proximal collar and the distal collar are comprised of electro-active polymer (EAP) material.

23. (Original) The catheter assembly of claim 22 wherein the EAP material is selected from at least one member of the group consisting of: Poly-pyrrole (PPY), Poly-Aniline (PAni), Poly-Thiofene (PTH), Poly-Paraphenylene Vinylene (PPV), Nation, Bucky paper, and any combination thereof.

24. (Original) The catheter assembly of claim 22 wherein when the proximal collar and the distal collar are exposed to the electric current the EAP material in each collar expands about 0.5% to about 20 percent.

25. (Original) The catheter assembly of claim 22 wherein the proximal collar and the distal collar are further comprised of at least one electrically conductive marker, the EAP material being a layer of material engaged to at least a portion of a surface of the at least one electrically conductive marker.

26. (Original) The catheter assembly of claim 25 wherein the at least one electrically conductive marker is constructed of at least one material of the group consisting of gold, platinum, silver, nitinol, and any combination thereof.

27. (Original) The catheter assembly of claim 26 wherein the at least one electrically conductive marker is in direct contact with a portion of the at least one electrically conductive member which radially extends through at least one opening in the catheter shaft.

28. (Original) The catheter assembly of claim 1 further comprising a distal hub, the distal hub fixedly engaged to the catheter shaft distal of the distal collar.

29. (Original) The catheter assembly of claim 1 further comprising a proximal hub, the proximal hub fixedly engaged to the catheter shaft proximal of the proximal collar.

30. (Original) The catheter assembly of claim 1 further comprising a secondary guidewire housing, the secondary guidewire housing comprising a substantially tubular member engaged to the balloon, the secondary guidewire housing defining a secondary guidewire lumen through which a secondary guidewire may be slidingly positioned.

31. (Original) The catheter assembly of claim 30 wherein the secondary guidewire housing is at least partially constructed of at least one material of the group consisting of: metal, polymer, natural rubber, silicone, urethanes, Pebax, HDPE, and any combination thereof.

32. (Original) The catheter assembly of claim 30 wherein the secondary guidewire housing is integral with the balloon.

33. (Original) The catheter assembly of claim 30 wherein the secondary guidewire housing is engaged to an external surface of the balloon.

34. (Original) The catheter assembly of claim 33 wherein the secondary guidewire housing is welded to the external surface of the balloon.

35. (Original) The catheter assembly of claim 30 wherein the secondary guidewire housing extends from a proximal end of the balloon body to an intermediate region of the balloon body.

36. (Original) The catheter assembly of claim 30 wherein the secondary guidewire has a length at least as long as the balloon body.

37. (Original) The catheter assembly of claim 30 further comprising a balloon expandable stent, the stent being expandable from an unexpanded configuration to and expanded configuration, in the unexpanded configuration the stent being disposed about at least a portion of the balloon body.

38. (Original) The catheter assembly of claim 37 wherein at least a proximal portion of the stent overlays at least a portion of the secondary guidewire housing.

39. (Original) The catheter assembly of claim 38 wherein the stent comprises a plurality of interconnected members, wherein adjacent members define openings there between, one of the openings being a secondary opening through which the secondary guidewire radially extends.

40. (Original) The catheter assembly of claim 39 wherein a distal end of the secondary guidewire housing extends radially through the secondary opening.

41. (Original) The catheter assembly of claim 37 wherein at least a portion of the stent is coated with at least one therapeutic agent.

42. (Previously Presented) The catheter assembly of claim 41 wherein the at least one therapeutic agent is at least one non-genetic therapeutic agent selected from at least one member of the group consisting of: anti-thrombogenic agents; anti-pro liferative agents; anti-inflammatory agents; antineoplastic/antiproliferative/anti-miotic agents; anesthetic agents including lidocaine, bupivacaine and ropivacaine; anti-coagulants; vascular cell growth promoters; vascular cell growth inhibitors; bifunctional molecules consisting of an antibody and a cytotoxin; cholesterol-lowering agents; vasodilating agents; and agents which interfere with endogenous vascoactive mechanisms, and any combinations thereof.

43. (Previously Presented) The catheter assembly of claim 41 wherein the at least one therapeutic agent is at least one genetic therapeutic agent selected from at least one member of the group consisting of: anti-sense DNA and RNA; DNA coding for anti-sense RNA, tRNA or rRNA to replace defective or deficient endogenous molecules; angiogenic factors including growth factors; cell cycle inhibitors including CD inhibitors, thymidine kinase ("TK") and other agents useful for interfering with cell proliferation; at least one of the family of bone morphogenic proteins ("BMP's"); dimeric proteins; molecules capable of inducing an upstream or downstream effect of a BMP, or the DNA's encoding them and any combinations thereof.

44. (Original) The catheter assembly of claim 41 wherein the at least one therapeutic agent is at least one type of cellular material selected from at least one member of the group consisting of: cells of human origin (autologous or allogeneic); cells of non-human origin (xenogeneic) and any combination thereof.

45. (Original) The catheter assembly of claim 44 wherein the cellular material is selected from at least one member of the group consisting of: side population cells; lineage negative cells; lineage negative CD34" cells; lineage negative $CD34^+$ cells; lineage negative "$cKit^+$ cells; mesenchymal stem cells; cord blood bells; cardiac or other tissue derived stem cells; whole bone marrow; bone marrow mononuclear cells; endothelial progenitor cells; satellite cells; muscle derived cells; go cells; endothelial cells; adult cardiomyocytes; fibroblasts; smooth muscle cells; cultures of mesenchymal stem cells with 5-aza forces differentiation into cardiomyocytes; adult cardiac fibroblasts+5-aza; genetically modified cells; tissue engineered grafts; MyoD scar fibroblasts; Pacing cells; embryonic stem cell clones; embryonic stem cells; fetal or neonatal cells; immunologically masked cells; tissue engineered grafts; genetically modified cells; teratoma derived cells and any combinations thereof.

46. (Previously Presented) The catheter assembly of claim 41 wherein the at least one therapeutic agent comprises at least one polymer coating, the at least one coating selected from at least one member of the group consisting of: polycarboxylic acids; cellulosic polymers, including cellulose acetate and cellulose nitrate; gelatin; polyvinylpyrrolidone; cross-linked polyvinylpyrrolidone; polyanhydrides including maleic anhydride polymers; polyamides; polyvinyl alcohols; copolymers of vinyl monomers; polyvinyl ethers; polyvinyl aromatics; polyethylene oxides; glycosaminoglycans; polysaccharides; polyethylene terephthalate; polyacrylamides; polyethers; polyether sulfone; polycarbonate; polypropylene; polyethylene; and high molecular weight polyethylene; polytetrafluoroethylene; polyurethanes; polyorthoesters; proteins; polypeptides; silicones; siloxane polymers; polylactic acid; polyglycolic acid; polycaprolactone; polyhydroxybutyrate valerate and blends and copolymers thereof; coatings from polymer dispersions; polysaccharides; hyaluronic acid; squalene emulsions; polyacrylic acid, a copolymer of polylactic acid and polycaprolactone; PGA-TMC, Tyrosine-Derived Polycarbonates and arylates; polycaprolactone co butyl acrylate and other co polymers; Poly-L-lactic acid blends with DL-Lactic Acid; Poly(lactic acid-co-glycolic acid); polycaprolactone co PLA; polycaprolactone co butyl acrylate and other copolymers; Tyrosine-Derived Polycarbonates and arylate; poly amino acid; polyphosphazenes; polyiminocarbonates; polydimethyltrimethylcarbonates; biodegradable CA/PO_4's; cyanoacrylate; 50/50 DLPLG; polydioxanone; polypropylene fumarate; polydepsipeptides; chitosan and Hydroxylpropylmethylcellulose; surface erodible material; maleic anhydride copolymers; zinc-calcium phosphate; amorphous polyanhydrides; sugar; carbohydrate; gelatin; biodegradable polymers; and polymers dissolvable in bodily fluids; A block copolymers; B block copolymers and any combinations thereof.

47. (Original) The catheter assembly of claim 4 further comprising an inflation fluid, the inflation fluid being injected into the balloon in order to expand the balloon from the unexpanded state to the expanded state, the inflation fluid being electrically conductive.

48. (Original) The catheter assembly of claim 47 wherein the proximal collar, the distal collar, the at least one electrically conductive member, the inflation fluid and the source of electric current forming an electric circuit through which the electric current flows to place the collars in the activated state.

49-50. (Canceled)

51. (Previously Presented) The catheter assembly of claim 42, wherein the non-genetic therapeutic agent is an anti-thrombogenic agent selected from at least one member of the group consisting of: heparin, heparin derivatives, urokinase, and PPack (dextrophenylalanine proline arginine chloromethylketone).

52. (Previously Presented) The catheter assembly of claim 42, wherein the non-genetic therapeutic agent is anti-proliferative agent selected from at least one member of the group consisting of: enoxaprin, angiopeptin, monoclonal antibodies capable of blocking smooth muscle cell proliferation, hirudin, and acetylsalicylic acid.

53. (Previously Presented) The catheter assembly of claim 42, wherein the non-genetic therapeutic agent is an anti-inflammatory agents selected from at least one member of the group consisting of: dexamethasone, prednisolone, corticosterone, budesonide, estrogen, sulfasalazine, and mesalamine.

54. (Previously Presented) The catheter assembly of claim 42, wherein the non-genetic therapeutic agent is selected from at least one member of the group consisting of: paclitaxel, 5-fluorouracil, cisplatin, vinblastine, vincristine, epothilones, endostatin, angiostatin, and thymidine kinase inhibitors.

55. (Previously Presented) The catheter assembly of claim 42, wherein the non-genetic therapeutic agent is an anti-coagulants selected from at least one member of the group consisting of: D-Phe-Pro-Arg chloromethyl keton, an RGD peptide-containing compound,

heparin, antithrombin compounds, platelet receptor antagonists, anti-thrombin antibodies, anti-platelet receptor antibodies, aspirin, prostaglandin inhibitors, platelet inhibitors, and tick antiplatelet peptides.

56. (New) A catheter assembly comprising:

a catheter shaft, the catheter shaft having a length and an outer surface;

a balloon disposed about at least a portion of the outer surface of the catheter shaft, the balloon comprising a proximal balloon waist, a distal balloon waist and a body portion there between, the balloon having an expanded state and a unexpanded state, in the expanded state the body portion having an expanded diameter and in the unexpanded state the body portion having an unexpanded diameter that is less than the expanded diameter; and

one or more collars disposed between the outer surface of the catheter shaft and at least one of the proximal waist and distal waist of the balloon, the one or more collars having a contracted state and an expanded state, wherein the balloon is rotatable relative to the catheter shaft when the one or more collars are in the contracted state and the balloon is sealingly engaged to the catheter shaft when the one or more collars are in the expanded state.

57. (New) The catheter assembly of claim 56, wherein the one or more collars are electrically actuatable between the contracted state and the expanded state.

58. (New) The catheter assembly of claim 56, wherein the one or more collars are fixed to at least one of the proximal waist and the distal waist of the balloon.

59. (New) The catheter assembly of claim 56, wherein the one or more collars are fixed to the catheter shaft.

60. (New) A catheter assembly comprising:

a catheter shaft including a proximal end, a distal end, and a lumen extending at least partially therebetween;

a balloon disposed about at least a portion of the catheter shaft adjacent to the distal end, wherein the balloon includes a proximal waist and a distal waist;

one or more electroactive polymers, wherein the one or more electroactive polymers are configured to expand when activated by an electrical current, wherein the balloon is rotatable relative to the catheter shaft when the one or more electroactive polymers are nonactivated and the balloon is sealingly engaged to the catheter shaft when the one or more electroactive polymers are activated.

61. (New) The catheter assembly of claim 60 wherein the one or more electroactive polymers includes a first electroactive polymer seal disposed between the proximal waist and the catheter shaft and a second electroactive polymer disposed between the distal waist and the catheter shaft.